CALIFORNIA ENERGY SYSTEMS FOR THE 21ST CENTURY

"The California Energy Systems for the 21st Century collaboration (or CES-21) will improve the information decision makers need to guide policy and investment in the state of California's multi-billion dollar energy infrastructure."

CES-21

THE CHALLENGE:

California and other Western states need to expand their energy infrastructure and improve the way it is managed to meet future energy needs, while also reducing such environmental impacts as carbon emissions. The power grid also needs to be modernized to better integrate and manage energy from alternative sources such as wind as well as accommodate expected growth.

A NEW APPROACH:

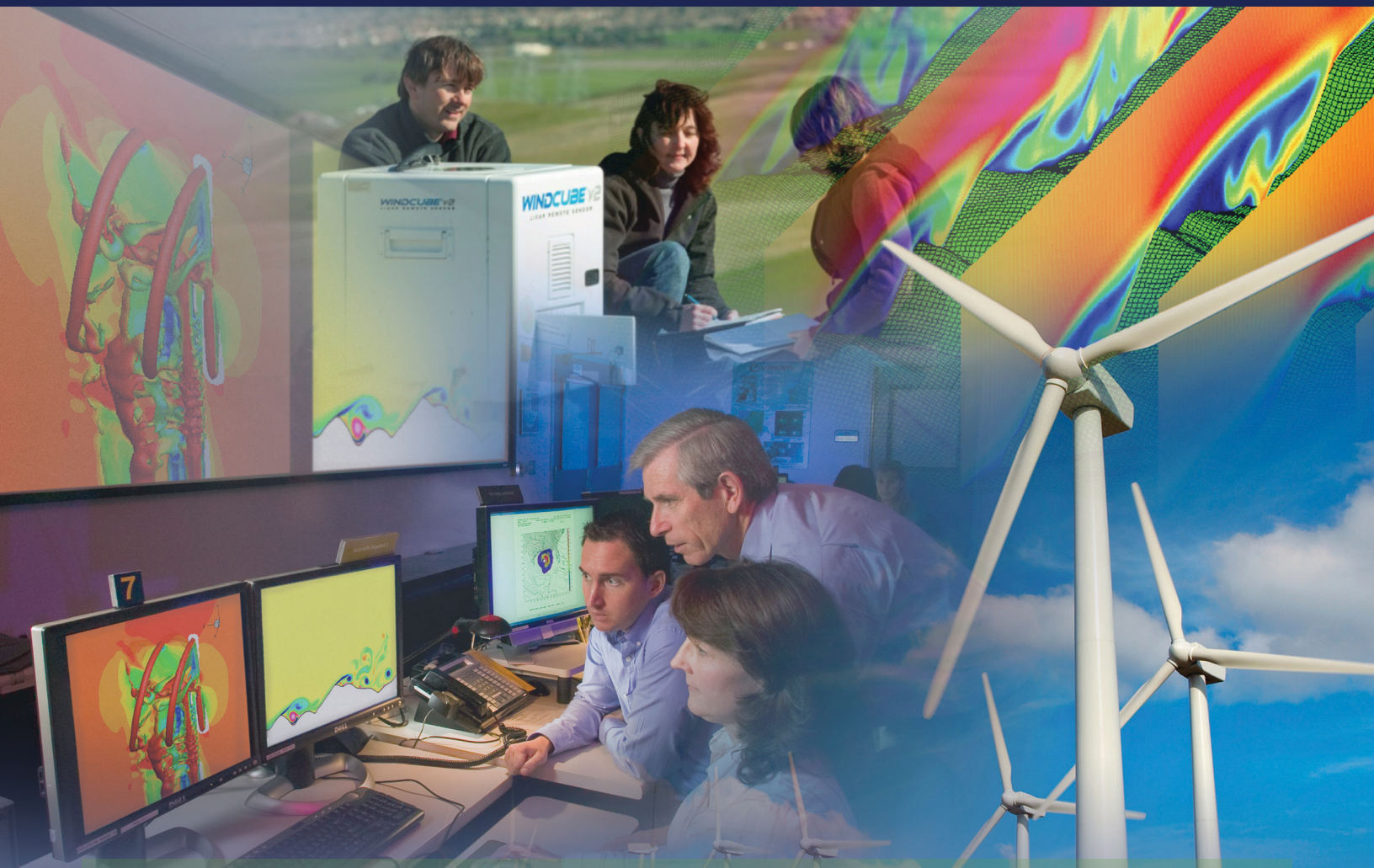
The California Public Utilities Commission and state investor-owned utilities (IOUs) are collaborating with Lawrence Livermore National Laboratory (LLNL) to improve and expand energy systems to meet 21st century needs.

CES-21 will create a set of collaborative technology development initiatives that will accelerate the deployment of advanced systems and technologies from renewable generation to smart grid technology.

CES-21 will develop proposals for needs in four key areas:

- Electric resource planning
- Smart grid operational tools
- Cyber security
- Gas system planning and operational tools

The owners, operators, regulators, and a joint team of technical experts will use the nation's most advanced modeling, simulation, and analytical tools to gain unprecedented insight and generate new data — information that can reduce risk and inform solutions to the problems faced by 21st century energy systems.



CES-21

WHAT THE COLLABORATION BRINGS:

CES-21 collaborators include San Diego Gas and Electric, Southern California Edison, Pacific Gas and Electric, the CPUC and LLNL. The IOUs will provide expertise in such areas as power generation, transmission and cyber security. LLNL brings expertise in computer modeling, simulation and analysis of complex systems, from global security to global climate, as well as the development of specialized HPC applications that address national challenges in security, energy and environment.

CES-21 will benefit from LLNL's extensive experience in national security work — supercomputing expertise developed to ensure the safety and security of the nation will be utilized to perform realistic and verifiable tests of how utilities will need to operate in the 21st century. High-performance computing will be the backbone of CES-21.

CES-21 is the result of years of discussions around future energy needs; renewable energy portfolio standards; and carbon reduction requirements in the Western states.

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